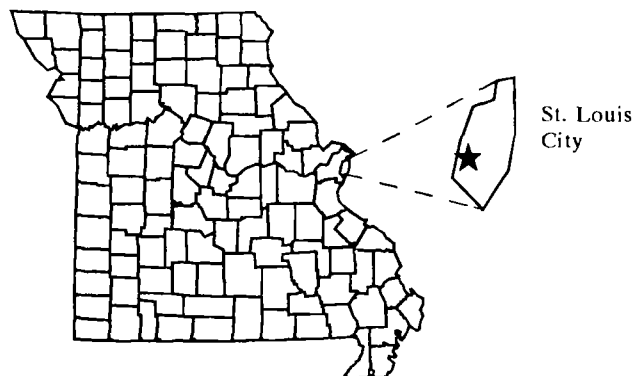


Site: Hubert Wheeler State
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Break: 1.5
Other: 1-7-94

PRELIMINARY ASSESSMENT
HUBERT WHEELER STATE SCHOOL
CITY OF ST. LOUIS, MISSOURI

January 7, 1994

Missouri Department of Natural Resources
Hazardous Waste Program



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DATE: January 7, 1994

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SITE: Hubert Wheeler State School
City of St. Louis, Missouri

1. INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Missouri Department of Natural Resources, through a cooperative agreement with the U.S. Environmental Protection Agency, conducted a preliminary assessment (PA) at the Hubert Wheeler State School site. The purpose of this investigation was to collect information concerning conditions at the site sufficient to assess the threat posed to human health and the environment, and to determine the need for additional investigation under CERCLA/SARA or other action. The scope of this investigation included review of available file information, a comprehensive source survey, a comprehensive target survey, and a site visit on October 7, 1993.

2. SITE DESCRIPTION, OPERATIONAL HISTORY AND WASTE CHARACTERISTICS

2.1 Location

The Hubert Wheeler State School site is located in the City of St. Louis, southeast of the intersection of I-44 and Hampton Avenue. The site can be entered by following Hampton Avenue south to Wilson Avenue, then east on Wilson Avenue. The site is located on the north side of the street, at 5707 Wilson Avenue. This location is approximately one mile south of Forest Park. The geographic coordinates of this location are 38° 35' 26.76" N latitude and 90° 17' 51.48" W longitude (References 3 and 4; Figure 1).

The City of St. Louis is characterized by climate of cold winters and long, hot summers. In summer, the average daily temperature is 77°F; in winter, 33°F. The average relative humidity in the midafternoon is 60 percent. Total annual precipitation for the area is 33.8 inches. The prevailing wind is from the south (Reference 6, page 2). The two-year 24-hour rainfall for this area is 3.5 inches (Reference 26). Average windspeed, 12 miles per hour, is highest in March (Reference 6, page 2).

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2.2 Site Description

The Hubert Wheeler State School is located at 5707 Wilson Avenue in St. Louis, in a mixed commercial and residential area. This school for severely developmentally disabled students has a student enrollment of 113 and 60 staff members (Reference 8, page 14; Reference 25). The area of known contamination underlies the asphalt playground of the school, which is approximately 100 feet by 60 feet in size (Reference 7, page 24). Cracks and fissures are visible in the asphalt surface, potentially exposing the children to both soil and air contamination (Reference 22).

2.3 Operational History and Waste Characteristics

Operational History

From 1907 to 1959, site ownership included a fire brick manufacturing company. Building and occupancy permits indicate that from 1950 to 1967, warehouse facilities were used by a coke and foundry supply as a storage area. The coke and foundry supply constructed a warehouse in 1960 to store naphtha. Aerial photographs indicate that demolition landfilling operations began north and west of the site in 1960. By 1969, the buildings previously located north of the site had been razed (Reference 7, pages 15-16). The Hubert Wheeler State School was constructed around 1978 (Reference 22).

A consultant was hired by the Division of Secondary and Elementary Education to conduct a subsurface assessment of the asphalt playground at the Hubert Wheeler State School. MDNR was first notified of the site on February 2, 1993. The consultant contacted MDNR to discuss remedial options for the asphalt playground. The school was reportedly constructed over an old city landfill. Black material was said to be "oozing" through the asphalt during the summer months and was alleged to flow freely at depths of four feet (Reference 9).

MDNR conducted a site visit on October 7, 1993. At that time, the tar-like material was not observed to be flowing at the asphalt surface. Two drums were observed to be in a trash dumpster on-site (Reference 22). The consultant reported that the drums contained rinsate water and drill cuttings. The drill cuttings were treated as a special waste and hauled to a landfill. The rinsate water was discharged into a sewer under a permit from the St. Louis Metropolitan Sewer District (Reference 7, pages 4-7; Reference 11).

Suspected sources of contamination would include the coke and foundry supply storage areas on or near the site and any demolition landfilling operations associated with the site (Reference 7, pages 15-16). Additional sources of contamination may include two former manufactured gas plant sites near the area, the Carondelet Coke Company and the Laclede Shrewbury Plant (Reference 21).

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Waste Characteristics

Sampling results indicate carcinogenic polynuclear aromatic hydrocarbons (PAHs) are present in the soils underlying the asphalt playground of the school. The highest levels of contamination were detected in borings collected from the southeastern quadrant of the asphalt playground, near the concrete walkway (Reference 7, pages 22 and 24). Carcinogenic PAHs and the highest levels detected on-site include: Benzo(a)anthracene (45 ppm), Chrysene (54 ppm), Benzo(b)fluoranthene (62 ppm), Benzo(k)fluoranthene (29 ppm), Benzo(a)pyrene (41 ppm), Indeno(1,2,3-cd)pyrene (18 ppm), and Dibenzo(a,h)anthracene (6 ppm) (Reference 7, page 22; Reference 24, page 5). The Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Concentration for Benzo(a)pyrene is .008 ppm (Reference 2, page B-56). Elevated levels of lead and zinc were also noted on-site. Total lead levels ranged from 14.5 ppm to 338 ppm. Total zinc levels ranged from 44.5 ppm to 163 ppm (Reference 7, pages 21 and 22).

3. GROUNDWATER PATHWAY

3.1 Hydrogeologic Setting

The surface of the St. Louis basin in this area is bedrock capped with 4-12 feet of loess on the uplands. The geology of the area is greatly influenced by the St. Francois uplift to the west (Reference 10, page 3).

In St. Louis and northern Jefferson County, streams flow through Mississippian limestone, but in the remainder of the St. Louis basin the upper drainages are in Cambrian dolomites or sandstone, then flow through a series of Ordovician aged dolomites and limestones (Reference 10, page 3).

Groundwater in the St. Louis area is highly mineralized. Total dissolved solids in the groundwater range from 1,000 - 10,000 parts per million, rendering the water unusable or poor to very poor in quality (Reference 15, page 52).

The presence of scattered surface exposures of Gasconade dolomite and Mississippian limestone ensures that there will be some infiltration of water to the subsurface in the City of St. Louis (Reference 10, page 3). Sinkholes are noted on topographic maps of the area. The nearest sinkhole to the site is located less than 1/4 mile to the southeast (Reference 4). The entire 4-mile target distance area is considered to be karst (Reference 15, page 39).

3.2 Groundwater Targets

There are no known drinking water wells within four miles of the site (Reference 23). The City of St. Louis obtains its drinking water from the Mississippi and Missouri Rivers (Reference 17, page 46).

3.3 Groundwater Conclusions

Groundwater in the St. Louis area is highly mineralized and not suitable for drinking water purposes. The area is karst, indicating that there is potential for contaminated surface water to infiltrate the groundwater.

4. SURFACE WATER PATHWAY

4.1 Hydrologic Setting

Surface water at the site would likely follow a topographic low to the east, then follow a sewer line to enter the River des Peres. River des Peres, a channelized river in the City of St. Louis, enters the Mississippi River 9.2 miles downstream of the probable point of entry. The end of the 15-mile target distance limit is just south of Cliff County Cave Park, on the Missouri bank of the Mississippi River (Reference 4; Figure 2).

The River des Peres is also state-designated for livestock and wildlife watering and protection of warm water aquatic life and human health - fish consumption (Reference 18, page 85). The segment of the Mississippi River that lies along the 15-mile target distance limit is state-designated for irrigation, livestock and wildlife watering, protection of warm water aquatic life and human health - fish consumption, boating, drinking water supply, and industrial uses (Reference 18, page 76).

4.2 Surface Water Targets

Drinking Water

There are no known drinking water intakes along the 15-mile target distance limit. A drinking water intake for the City of St. Louis is located along the Mississippi River at the Chain of Rocks (Reference 15, pages 80 and 81; Reference 17, page 170). An intake is also located along the Illinois bank (Reference 16). Both of these intakes are upstream of the confluence of the River des Peres and the Mississippi. The segment of the Mississippi River that lies along the 15-mile target distance limit is state-designated for drinking water supply (Reference 18, page 76).

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Fisheries

Both the River des Peres and the Mississippi River are state-designated for the protection of warm water aquatic life and human health - fish consumption (Reference 18, pages 76 and 85). The Mississippi River is a commercial fishery.

Sensitive Environments

There is approximately one mile of wetland frontage along the Illinois bank of the Mississippi River, at the confluence of the Mississippi and Palmer Creek. This location is approximately 13.5 river miles downstream of the probable point of entry. Smaller wetlands may be present (Reference 4).

Sensitive species within the vicinity of the site have historically included the sicklefin chub, Macrhybopsis Meeki, and the auriculate false foxglove, Agalinis Auriculata. These species are candidates for federal listing and are state-listed rare. Other state-listed species are noted within the area (Reference 12).

4.3 Surface Water Conclusions

Drainage from the site flows into the River des Peres, a channelized river in the City of St. Louis. The River des Peres drains into the Mississippi River. There are no known drinking water intakes along the 15-mile target distance limit. No wetlands or sensitive environments are known to be located along the River des Peres. At least one mile of wetland frontage is represented along the Mississippi River, and some sensitive environments were also noted. Both the River des Peres and the Mississippi River are state-designated for the protection of warm water aquatic life and human health - fish consumption. The Mississippi River is a commercial fishery.

5. SOIL EXPOSURE AND AIR PATHWAYS

5.1 Physical Conditions

Soils in the St. Louis area were formed from silty fill material, loess and alluvium (Reference 5, General Soil Map). The area of known contamination is covered by an asphalt cover less than 6 inches in depth. The asphalt is cracked and does not provide an impenetrable cover. Boring logs of the top ten feet of soil indicate the fill material underlying the asphalt is a mix of sand, gravel, and brick. Cinders were noted in some areas of fill. Limestone cobbles and silty clays were also represented (Reference 7, pages 34-44).

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5.2 Soil and Air Targets

The Hubert Wheeler State School is a school for severely developmentally disabled students. The school has a student enrollment of 113 and 60 staff members (Reference 8, page 14; Reference 25). Many of these students have severe mobility limitations requiring wheelchairs, walkers, or braces. These children would be more likely to sit on the ground for long periods of time if not moved by staff, potentially exposing them to contamination for longer periods of time. In addition, pica, the craving or tendency to eat non-food items, is found more frequently in student populations with developmental disabilities. Rocks, metal parts, paper, grass, and dirt are commonly ingested items. Developmentally disabled and physically challenged students also have more frequent and severe health problems than would be expected in a mainstream student population. Some of the students may have other medical problems that may make them more susceptible to environmental factors (Reference 19).

Approximately 761,222 people live within a four mile radius of the site (Reference 13). There are more than 75 schools located within four miles of the site. Vigo Park, Clifton Park, and Frisco Park are located within one-half mile of the site. Tower Grove Park, Lindenwood Park, Tilles Park, Forest Park (including the St. Louis Science Center, the Municipal Theater and the Art Museum), and the Missouri Botanical Garden are located within one to two miles of the site (Reference 4).

Sensitive species within the vicinity of the site have historically included the auriculate false foxglove, Agalinis Auriculata, a candidate for federal listing and state-listed rare. Other state-listed species are noted within the area (Reference 12).

5.3 Soil Exposure and Air Pathway Conclusions

Sampling results indicate that carcinogenic compounds were detected in the soil underlying the asphalt at levels which greatly exceed health-based benchmarks. The asphalt is used as a playground by the school. Cracks and fissures are visible in the asphalt surface, potentially exposing the children to both soil and air contamination (References 2 and 7). Children attending the Hubert Wheeler State School are more likely to be susceptible to on-site contamination than children attending mainstream elementary schools (Reference 19).

6. SUMMARY AND CONCLUSIONS

SUMMARY

The Hubert Wheeler State School is a school for severely developmentally disabled students. Sampling results indicate that carcinogenic compounds were detected in the soil underlying the asphalt playground at the school at levels that greatly exceed health-based benchmarks. Cracks and fissures are visible in the asphalt surface, potentially exposing the children to both soil and air contamination. The school has a student enrollment of 113 and 60 staff members. Approximately 761,222 people live within a four mile radius of the site. There are more than 75 schools and seven parks located within four miles of the site.

Groundwater

Groundwater in the St. Louis area is highly mineralized and not suitable for drinking water purposes. The area is karst, indicating that there is potential for contaminated surface water to infiltrate the groundwater.

Surface Water

Drainage from the site flows into the River des Peres, a channelized river in the City of St. Louis, and enters the Mississippi River. There are no known drinking water intakes along the 15-mile target distance limit. One mile of known wetland frontage is represented along the Mississippi River.

Sensitive species within the vicinity of the site have historically included the sicklefin chub, Macrhybopsis Meeki, and the auriculate false foxglove, Agalinis Auriculata. These species are candidates for federal listing and are state-listed rare. Other state-listed species are noted within the area (Reference 12).

Both the River des Peres and the Mississippi River are state-designated for the protection of warm water aquatic life and human health - fish consumption. The Mississippi River is a commercial fishery.

Soil and Air

Sampling results indicate that carcinogenic compounds were detected in the soil underlying the asphalt playground. Benzo(a)pyrene was detected at levels (up to 41 ppm) which greatly exceed the Cancer Reference Screening dose of .008 ppm Benzo(a)pyrene. Cracks and fissures in the asphalt surface may expose the 113 students and 60 staff members to contamination via both the soil and air pathways.

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The students at the Hubert Wheeler State School are more likely to be exposed to contamination than mainstream school children, due to their limited mobility and a higher frequency of pica behavior. These students are also more likely to be susceptible to environmental factors, due to their physical limitations.

CONCLUSIONS

The Hubert Wheeler State School site is currently under evaluation by the Division of Elementary and Secondary Education (DESE) through their consultant, Geotechnology. The consultant's report recommends additional investigative actions, including a magnetometer/gradiometer survey and exploratory excavations, and development of a remedial action plan (Reference 7, page 20). MDNR, in concurrence with the Missouri Department of Health (MDOH), has recommended that access to the asphalt playground be restricted to personnel involved in the hazardous substance assessment and remediation projects (References 27 and 28). Further actions, in the form of a site inspection and/or a removal action, may be warranted at this site.

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Figure 1
Site map including 1 mile radius

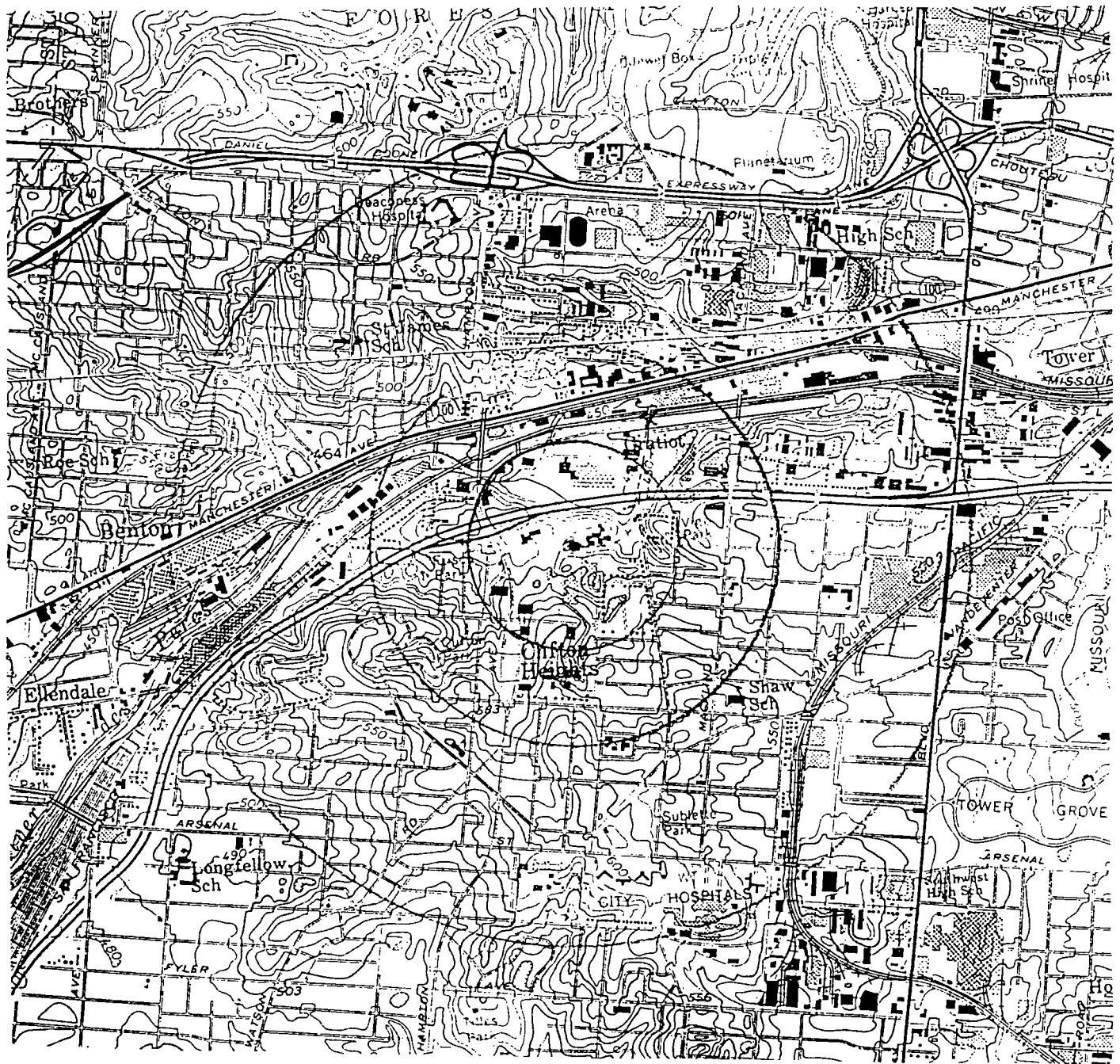


Figure 2
Site map including 15-mile surface water pathway

